

COVID-19 and Refractive Errors: A New Potential Threat for Children and Adolescents

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ABSTRACT

The current pandemic has changed the social life and learning of most children and adolescents around the world due to public health restrictions. In response to this, they have spent more time on computer and television monitor screens, which should negatively impact their eye health. Thus, here we discuss the possible association between the imposed home confinement and risk of developing 'quarantine myopia' in children and adolescents.

Keywords: COVID-19, SARS-CoV-2, pandemics, myopia, child

Dear Editor,

The present global epidemic of coronavirus disease 2019 (COVID-19) represents a major threat to public health worldwide [1-3]. The virus that causes the disease was named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), and it is characterized by high transmissibility (3- and 10-fold higher than those of severe acute respiratory syndrome coronavirus (SARS-CoV) and Middle east respiratory syndrome coronavirus (MERS-CoV)), which has been proven to be directly related to the sequence of the S protein of the virus [4]. Given the current scenario, governments all over the world have imposed strong public health restrictions, including social distancing, travel prohibitions, and quarantines, in order to decrease the impact of the epidemic on the population as well as on global healthcare systems [5-7]. Given this and the increasing number of SARS-CoV-2 infections, the population lifestyle is forcefully subjected to significant modifications, including decreased physical activity levels, irregular sleep habits [8] and, importantly, more time spent on computer and television monitor screens [9].

From an ophthalmological perspective, a new concern is emerging: the possible association between the imposed home confinement and risk of developing 'quarantine myopia' in children and adolescents [10]. In fact, it has been largely demonstrated that myopia progression is related to intense near-work activity, an increased screen-time and, notably, to the reduced possibility of doing outdoor activities (due to quarantine restrictions) [11]. In this regard, although there is still no consistent evidence about the pathogenic mechanism at the base of myopia progression in children doing less outdoor activities and more near-work activity, preclinical models have shown that this could be associated with an altered dopamine metabolism in the ocular tissues [12].

According to the United Nations Educational, Scientific, and Cultural Organization (UNESCO), around 80% of the schools have been closed worldwide in more than 138 countries in the attempt of containing SARS-CoV-2 infection [13]. Thus, in order to respond to this situation and ensure children and adolescents' education, many national governments have made a massive effort of creating online courses delivered by TV broadcasts or internet [9]. Nonetheless, in some Asian eastern countries (such as China) the prevalence of myopia has rapidly grown in the last years due to the replacement of books with tablets and computers in schools [14]. In this sense, the World Health Organization (WHO) has already elaborated recommendations on sedentary screen time for children younger than 5 years old, because of the possible negative impact on their overall health, including the augmented risk of developing digital eye strain, mental and musculoskeletal disorders, and diabetes [15].

Given this background, a prolonged time of home quarantine could represent a non-negligible risk factor for the increased onset and progression of myopia in children and adolescents. In fact, children and adolescents confined at home are more likely inclined to spend more time on TV and computers, which increases the time spent on near-work activities and decreases the time on outdoor activities. For these reasons, important concerns are raised for the possible increased progression of myopia in children, especially in low-developed countries, representing an important cause of visual impairment in these population groups. Moreover, this would also lead to an increased incidence of high-myopia and its possible severe ocular complications in older patients in the future.

Thus, we deem that a myopia screening strategy with a complete ophthalmological examination should be encouraged for these children and adolescents, by stratifying

the risk in relation to demographic and clinical features. In addition to this, appropriate educational strategies in this direction should also be developed, including a revision in different levels and modalities of the educational system, as well as the development of a more solid awareness for both the parents and children of their ocular health.

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